## REMARKS

Favorable consideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-13 are presently pending in this application, Claims 1-13 having been amended by the present amendment.

In the outstanding Office Action, Claim 8 was rejected under 35 U.S.C. §112, second paragraph, for being indefinite; Claims 1-4, 6-8 and 11-13 were rejected under 35 U.S.C. §103(a) as being unpatentable over Kang et al. (U.S. Patent 6,171,965); Claims 5 and 9-10 were rejected under 35 U.S.C. §103(a) as being unpatentable over Kang et al. in view of Steckl et al. (U.S. Patent 5,759,908); and Claims 1-4, 6-8 and 11-13 were rejected under 35 U.S.C. §103(a) as being unpatentable over Henley et al. (U.S. Patent 6,013,563).

With regard to the rejection under 35 U.S.C. §112, second paragraph, Claim 8 has been amended to depend from Claim 7. Thus, Claim 8 is believed to be in compliance with the requirements of the statute. Also, Claims 1-13 have been amended for further clarification of their subject matters. If, however, the Examiner disagrees, the Examiner is invited to telephone the undersigned who will be happy to work in a joint effort to derive mutually satisfactory claim language.

Briefly recapitulating, Claim 1 of the present invention is directed to a process for fabricating a structure having a carrier substrate and a layer of semiconductor material on one surface of the carrier substrate, and including the following successive steps: a) forming a layer of semiconductor material on one surface of a first substrate; b) implanting ions in the first substrate under the surface in the vicinity of the layer of semiconductor material to form



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a cleavage zone which delimits a superficial layer in the first substrate in contact with the layer of semiconductor material; c) transferring of the first substrate with the layer of semiconductor material onto the carrier substrate while leaving the superficial layer in contact with the layer of semiconductor material, the layer of semiconductor material being made integral with the carrier substrate; d) providing energy to cause cleavage of the first substrate along the cleavage zone, the superficial layer of the first substrate remaining integral with the layer of semiconductor material and the carrier substrate during the cleavage; and e) removing the superficial layer left over the layer of semiconductor material to uncover the layer of semiconductor material. *By transferring and removing the superficial layer left over the layer of semiconductor material to uncover the layer of semiconductor material* as such, a structure, such as a SiC-oxide-silicon, having an excellent surface condition for, for example, forming a GaN layer, can be economically fabricated in a larger scale without a high heat schedule.[1]

Kang et al. disclose a "treatment method of cleaved film for the manufacture of substrate." Nevertheless, Kang et al. do not teach transferring of the first substrate with the layer of semiconductor material onto the carrier substrate while leaving the superficial layer in contact with the layer of semiconductor material, the layer of semiconductor material being made integral with the carrier substrate, and removing the superficial layer left over the layer of semiconductor material to uncover the layer of semiconductor material as recited in Claim 1. Instead, Kang et al. disclose how to cut off a thin layer 2101 from a substrate 2100 and provide the thin layer 2101 over the insulator layer 2305, thereby fabricating a sandwich

[1] Specification, page 5, lines 4-16.

structure consisting of the thin layer 2101, insulator layer 2305 and target wafer 2201.[2] As such, Kang et al. disclose *polishing* a rough surface 2404 formed on the thin layer 2101 as a result of the cleaving, *instead of removing* the thin layer 2101 *to uncover* the insulator layer 2305.[3]

Also, the Office Action asserts that the semiconductor substrate can be disposed on a workpiece such as a stiffener encompasses the step of forming a layer of semiconductor material on the substrate. However, it is respectfully submitted that under such an assumption, the whole substrate would form the "semiconductor layer." This, in turn, would lead to the cleaving of the semiconductor material layer, not the substrate on which the semiconductor layer is formed.

Therefore, the subject matter recited in Claim 1 is clearly distinguishable from Kang et al.

Henley et al. disclose a controlled cleaning process but do not teach the transferring and removing steps as recited in Claim 1. Like Kang et al., Henley et al. disclose providing the thin layer 2101 over the insulator layer 2305 by cutting off a thin layer from a substrate 2100, and smoothing out a rough surface 2404 of the thin layer 2101.[4] Accordingly, the subject matter recited in Claim 1 is also distinguishable from Henley et al.

Steckl et al. simply disclose a method for forming an epitaxial SiC layer over a silicon SOI substrate by converting a thin Si layer to SiC by carbonization,[5] and do not teach the

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[2] Kang et al., column 13, lines 32-36 and column 15, lines 19-35.

[3] Id.

[4] Henley et al., column 14, lines 55-67.

[5] Steckl et al., column 2, lines 16-33.



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transferring and removing steps recited in Claim 1. Thus, the subject matter recited in Claim 1 is clearly distinguishable from Steckl et al.

Because none of Kang et al., Henley et al. and Steckl et al. discloses the transferring and removing steps as recited in Claim 1, even the combined teachings of these cited references would not render the subject matter recited in Claim 1 obvious.

For the foregoing reasons, Claim 1 is believed to be allowable. Furthermore, since Claims 2-13 ultimately depend from Claim 1, substantially the same arguments set forth above also apply to these dependent claims. Hence, Claims 2-13 are believed to be allowable as well.

In view of the amendments and discussions presented above, Applicant respectfully submits that the present application is in condition for allowance, and an early action favorable to that effect is earnestly solicited.

Respectfully submitted,

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**IN THE TITLE**

Please change the title in the PTO database to reflect the title, as shown in the Declaration and the first page of the specification, which is:

--PROCESS FOR FABRICATING A STRUCTURE OF SEMICONDUCTOR-ON-INSULATOR TYPE, IN PARTICULAR SiCOI--

**IN THE CLAIMS**

Please amend Claims 1-13 as follows:

1. (Amended) A process [Process] for fabricating a structure comprising a carrier substrate and a layer of semiconductor material on one surface of the carrier substrate, the process comprising the following successive steps:

a) forming a layer of semiconductor material on one surface of a first substrate[,];

b) implanting ions in the first substrate[,] under said one surface[,] in the vicinity of the layer of semiconductor material[,] to form a [zone, called a] cleavage zone[,] which delimits a superficial layer in the first substrate[,] in contact with the layer of semiconductor material[,];

c) transferring [transfer of] the first substrate[,] with the layer of semiconductor material[,] onto the carrier substrate[,] while leaving the superficial layer in contact with the layer of semiconductor material, the layer of semiconductor material being made integral with the carrier substrate[,];



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d) providing energy to cause cleavage of the first substrate along the cleavage zone, the superficial layer of the first substrate remaining integral with the layer of semiconductor material and [with] the carrier substrate during [this] the cleavage[,]; and

e) removing said superficial layer left over the layer of semiconductor material to uncover the layer of semiconductor material.

2. (Amended) A process [Process] according to claim 1, [in which, during] wherein the step d) comprises supplying the [supply of] energy [is made] in a form [chosen from among a supply] of at least one of thermal energy[, a supply of] and mechanical energy[, or a supply of a combination of these energies].

3. (Amended) A process [Process] according to claim 1, [in which] wherein the step e) [is implemented according to a removal mode chosen from among] comprises at least one of wet chemical etching, [or] dry chemical etching, polishing, and oxidation followed by etching[, or a combination of these modes].

4. (Amended) A process [Process] according to claim 1, [in which] wherein the first substrate is a silicon substrate and the layer of semiconductor material is a layer of silicon carbide.

5. (Amended) A process [Process] according to claim 4, [in which] wherein the layer of [semiconductor material in] silicon carbide is obtained by causing the silicon [of the first] substrate to react with a hydrocarbon.

6. (Amended) A process [Process] according to claim 1, [in which] further comprising forming an insulator layer [is formed] on the layer of semiconductor material before [ion implantation] the step b).

7. (Amended) A process [Process] according to claim 1, [in which] wherein:



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the [a] carrier substrate [is used which] has a superficial insulator layer; and [in which, during]

the step c)[,] comprises transferring the first substrate [is transferred] with the layer of semiconductor material onto the superficial insulator layer of the carrier substrate.

8. (Amended) A process [Process] according to claim [2] 7, [in which] wherein the superficial insulator layer is an oxide.

9. (Amended) A process [Process] according to claim 1, [in which,] further comprising forming [after step e), on the layer of semiconductor material,] epitaxial growth of the same semiconductor material on the layer of semiconductor material after the step e) [is made] in order to increase the thickness of the layer of semiconductor material.

10. (Amended) A process [Process] according to claim 4, [in which, after step e),] further comprising forming [on silicon carbide layer,] a layer of GaN [is formed] on the layer of silicon carbide after the step e).

11. (Amended) A process [Process] according to claim 1, [in which] wherein the layer of semiconductor material is made integral with the carrier substrate by heat treatment.

12. (Amended) A process [Process] according to claim 11, wherein [in which] said heat treatment, to render the layer of semiconductor material integral with the carrier substrate, is extended to additionally cause the cleavage of the step d).

13. (Amended) A process [Process] according to claim [3] 6, [in which] wherein the insulator layer is an oxide.--



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